Coopers and Lybrand
Custom Project
Summary of U.S. Interviews -- 11/1/91

(FINAL - includes vendor names)

Introduction

This summary is based on interviews of six major information services vendors and seven user companies. Vendor names and user industries are listed below.

Vendors:
- American Management Systems
- Andersen Consulting
- Cap Gemini America
- Computer Sciences Corp.- commercial systems group
- Electronic Data Systems
- Nynex/AGS Computer Services

User Industries:
- Food and Beverage (2 companies)
- Chemicals
- Pharmaceuticals
- Automotive
- Insurance
- Banking

BACKUP

includes vendor names

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Contents of this report are as follows:

- **Overall Conclusions:** This section lists highlights of the findings, from both vendor and user interviews.
- **Analysis by Question - Vendors:** Detailed findings, following the order of the vendor interviews, and referenced by vendor question numbers (open-ended or qualitative questions only). Responses to key questions on development approaches are summarized in tables.
- **Analysis by Question - Users:** Detailed findings, following the order of the user interviews, and referenced by user question numbers (open-ended or qualitative questions only). Responses to key questions on development approaches are summarized in tables.

Overall Conclusions

Overall trends noted are as follows:

Application Packages:

Software packages are widely used, but primarily for financial, human resources, and some manufacturing applications.

References to industry-specific software were less focused, but came up in various contexts:

- Four out of six vendors stated that they work with manufacturing application packages.
- Three of six vendors derive significant percentages of revenue from proprietary industry-specific software, including products for the manufacturing, distribution, banking, government, and telecommunications sectors.
- Vendors also mentioned use of third party software for health care, insurance, and logistics applications.
- Users mentioned package-based systems for manufacturing applications, materials management, and inventory (food, chemicals); plant maintenance (chemicals); and banking systems (for bank processing services).

Vendors reported a low level of "vanilla" installs. Users appear to do some amount of these, but on their own.

- One vendor confirmed that even in sales of its proprietary software, it is rarely-to-never contracted for implementation services unless significant customization is required.
- Note that package customization may include actual code modification, as well as significant tailoring using vendor-provided tools.

Kernel/CASE Development:

Use of a kernel/CASE approach varies from none to very heavy, with certain user companies the most heavily invested in this approach.

- Four of seven user companies interviewed use CASE tools for 20% or more of their development projects; a fifth uses CASE re-engineering facilities for most of its applications maintenance.
  - Three companies using CASE (food companies, pharmaceuticals) see this as the preferred approach for developing strategic, high priority, or mission critical systems.
  - The pharmaceutical company has made CASE development the corporate standard, with 70% of development projects using CASE tools.
- Only two of six vendors claim to employ a kernel/CASE approach in a significant percentage of projects.
  - One of these favors proprietary and third party CASE tools for the most part; the other focuses on pre-coded applications (not developed to the point where they are considered a "package.")

Custom Systems Development:

The degree of custom development among large vendors and large user companies appears to have declined overall.

- Some vendors commented that the increasing complexity of these systems supports a trend for more custom work to be contracted out to services firms.

Custom applications are typically more strategic, mission critical, and customer-oriented. They must justify their high cost and risk with significant returns.

Future Development Trends:

Views on development trends 3-4 years in the future are generally as follows:

- Greater use of packages, primarily in financial/back office systems, and manufacturing-related applications
- Greater use of kernel/CASE approaches
- Custom development decreasing or staying the same

Vendors' Industry Specialization:

Vendors' industry specializations vary by company, but common verticals are manufacturing, financial services, and government.

High Demand Applications:

Application areas mentioned by vendors as being in particularly high demand are:

- Any systems considered strategic or mission critical. Specific applications vary by industry.
- Customer-oriented systems: sales and marketing, customer service, order processing. User comments on their highest priority systems supported vendors' comments here.
- Factory shop floor systems

Highest priority systems mentioned by users include the following. Applications mentioned most frequently are listed first.

- Food, Pharmaceuticals, and Automotive: Marketing and sales; laptop systems
- Food, Chemicals, and Automotive: Order management/order processing
- Automotive: Customer service/warranty system
- Food: Logistics, warehousing, materials management

- Chemicals: Plant maintenance and safety-related systems
- Pharmaceuticals: Research/product development
- Banking: Wire transfer, trust processing, direct customer systems, and bulk data transfer

Human resource systems were the most commonly mentioned projects among users, but none were considered "high priority:"

- Five of seven companies have human resource and/or payroll systems projects under way. All are package-based.

Outsourcing:

Outsourcing is seen by a trend more emphatically by vendors than users.

- All but one vendor sees this as an important trend; one of these has traditionally focused on outsourcing.
- Four users see outsourcing as an option that must be evaluated, or that they might consider at some time in the future. None indicated specific plans to outsource.

Business Function Re-engineering:

Interest in re-engineering business functions is high among both vendors and users.

- Six of seven users said business re-engineering was ongoing to some degree; four have made significant investments in this area.
- Five of six vendors see re-engineering growing.

IS Organization:

A possible trend among users is to decentralize systems development.

- Four of seven users are decentralized - three by business unit and a fourth (automotive) by region.
- Two others have elements of both centralized and decentralized organization.
- Only one user company (smaller food co.) is completely centralized.

Analysis by Question - Vendors

1. **Development approaches, next 12-24 months.**

The following exhibit summarizes vendors' development approaches. Detailed comments follow the exhibit.

EXHIBIT A
ESTIMATED PERCENTAGE OF PROJECTS - NEXT 1-2 YEARS
VENDORS

ITEM	"Vanilla" Package	Mix Package/ Custom	Kernel/ CASE	Pure Custom
American Mgt Systems	5-10%	50%	25% (a)	25%
AGS Computer Services	<5% (b)	aim here	very little (c)	moderate
Andersen Consulting	5%	60%	30% (d)	5%
Cap Gemini/America	very little	20%	none (e)	70-80%
Computer Sciences	very little	some (f)	interest (g)	heavy (f)
Electronic Data Systems	very little	20%	some (h)	80% (g)

(a) *AMS uses primarily "core foundation software." The term refers to pre-coded applications not to the level of a package.*

(b) *. . . for cost, time savings*

(c) *AGS uses the term "platform" to refer to productivity gains from industry expertise and design skills; does not equate this to kernel.*

(d) *Primarily use of Andersen CASE tools, sometime in conjunction with "designware" Also includes some work using third party CASE tools, productivity aids, and EIS products.*

(e) *Cap Gemini sometimes offers previously-used designs; rarely previously-used code. Does not see kernel as a viable option until object-oriented technology matures.*

(f) *CSC's "typical" integration deal is 10-15% software license fees; 45% custom and services; 40% hardware.*

(g) *Interest among CSC clients, but no widespread success stories.*

(h) *EDS estimated that 80% of work falls in the area of custom and kernel, but that most is custom. Feels kernel has no real value in their customers' eyes.*

Application packages with little customization:

All vendors stated that "vanilla" package implementations with little-to-no customization are extremely rare.

- Andersen noted that even in sales of its own products, they are rarely contracted for services when significant customization is not required. Usually these cases involve AS/400-based financial modules, sold through a re-seller.

Customized application packages:

Projects involving a mix of package and custom development are quite common - up to 50-60% of business for the leaders in this area.

CSC noted that most major integration deals involve a mix of package and custom work, with the typical fee breakdown as follows: 40% hardware, 10-15% package software licenses, and 45% customization and custom development.

Two vendors (CSC and Andersen) noted a concern that third party software providers have not kept up with users' expressed needs for client/server-based systems. One suggested that this might slow down sales of financial software products.

AMS and Andersen have the most package-intensive businesses of vendors interviewed; both also have their own industry-specific software products.

- Both vendors indicated that their software development either takes place in conjunction with client projects, or is driven by clients' needs.
  - Examples of recent "products" developed by Andersen include two designware packages: one for the utility industry, and another for financial services firms; and a set of process manufacturing applications.
- AMS' package-based business can be summarized as follows:
  - Comprises approximately 50% of revenues
  - Over 15% of revenues are from license fees for government, banking, and telecommunications software products.
  - Uses proprietary applications almost exclusively.

- Andersen's package-based business can be summarized as follows:
  - Comprises approximately 60% of revenues
  - About 10% of revenues are from license fees, primarily for manufacturing and distribution software products.
  - Uses both proprietary applications and third party products.

Reasons given for customizing packages include:

- Too many client-specific issues
- Need for custom interfaces
- Complexity of clients' businesses, and the large size of most clients.

Applications mentioned frequently as typical for packages were financial, back/office, and some manufacturing functions. Other applications mentioned are listed below:

- Banking applications (AGS and AMS - proprietary software)
- Manufacturing, MRPII (EDS, and CSC - third party software; Andersen proprietary software)
- Logistics and distribution (EDS - third party software; Andersen - proprietary software)
- Health care applications (CSC - third party software)
- Insurance (EDS - third party software)
- Customer systems for the telecommunications industry; financial and administrative systems for state and local governments (AMS - proprietary software)

CSC noted the manufacturing and health care industries are more package-oriented than most.

Kernel/CASE-based solutions:

There was far less agreement among vendors on this issue than on packages, and less CASE activity among vendors than users.

There was general agreement that kernel or CASE development has future potential, but only two vendors (AMS and Andersen) have significant business in this area - 25% and 30%, respectively.

Vendors also differ widely in approach to the problem of increasing productivity in development of "custom" or "non-packaged" systems, as the following examples illustrate.

- AGS: Feels that Industry-specific design expertise (not coded kernels or components) that a vendor brings to a client are more effective in speeding up expedite development.
- EDS: Notes a number of problems with kernel/CASE:
    - Not a large part of current business because customers do not perceive value in this approach; tools only assist the vendor in doing the project faster.
    - CASE tools are not powerful or flexible enough - they are only useful when they cover the whole scheme of design-development-maintenance and allow a high degree of customization.
    - Kernels also require a high degree of customization. Beginning to consider use of kernels in downsizing existing applications.
- AMS: Offers "core foundation software" used as a starting point for development; not a full blown package. Some clients find this preferable / more flexible than a fully coded package for applications where business requirements differ among companies, e.g. distribution applications.
- CSC: Notes high interest in tools to develop and support applications, but no consistently big success stories.
- Cap Gemini: Kernel approach is not a part of their current business. Expect this to change as object oriented technology matures, but not in the near future. Offers clients previously used functional designs. Feel this is more usable than previously written code. This approach often wins in competition with software packages.

Custom systems development

This remains the majority of business for three of the six vendors (Cap Gemini, EDS, and CSC).

Comments offered by vendors are as follows:

- AGS: Existing platforms can reduce time and cost, but lots of custom work still happens; not expected to decrease.
- CSC: Custom work is very prevalent, especially for strategic/mission critical applications, e.g. customer, sales, order processing systems.
- Andersen: Although only 5% of business is estimated to be purely custom (and decreasing), possibly 50% of "function points" produced for clients are custom, indicating a high degree of mixed development.
- AMS: The technical environment may sometimes dictate custom development because available packages do not operate on the client's platform.
- Cap Gemini: 70-80% of work is still custom, because packages are not available for unique or mission critical business functions, and sometimes as a matter of clients' philosophy (to make their own rather than buy outside-developed systems).

2. Types of systems being developed for clients:

Responses vary widely by company. Each has specialization in different vertical markets.

- Andersen: Roughly follows the SIC code mix, i.e. manufacturing the largest group, but business in government sectors is proportionately lower.
    - Mostly mission critical systems, planning and implementation.
    - Oil and gas is particularly quiet, but with an upswing in order processing and distribution systems. Less in industry-specific financials (joint interest billing, etc.)
    - Doing more with hardware/device-specific interfaces; "workplace floor," e.g. health care, factory floor.
    - Customer service and client/server systems appear to be "hot."

- EDS: Transportation, energy, manufacturing, health care (new systems); finance and insurance (mostly consolidation)
- AGS: Financial and insurance industry (mostly packages in banks, custom for insurance and brokerage); discrete manufacturing; state and local government; network-oriented systems
- AMS: Government (all levels), banking, telecommunications
- CSC: Hot areas are customer sales, marketing, customer service, order processing, and materials management
- Cap Gemini: Manufacturing, all levels: shop floor to MRP

3a. Trends in systems development -- outsourcing

All vendors but one felt that outsourcing is definitely a growing trend.

- EDS: has traditionally focused its business in this area.
- AGS: sees outsourcing as growing, but not a cascade or waterfall
- CSC: is building its outsourcing business; recently closed a very large defense industry contract. Recommends outsourcing of commodity systems as a way to focus internal resources on value-added systems. Sees outsourcing growing faster than packages or custom development.
- AMS: expects this market will increase as users' influence in systems decisions grows (users are more cost conscious).
- Cap Gemini: sees outsourcing growing in all industries, especially high volume users; primarily mainframe systems.
- Andersen: (alone) is not convinced that outsourcing is here to stay. Suggests this is more of a trend in the non-Fortune 100 arena, e.g. small government organizations, regional cooperative power companies, regional hospitals. Notes that a few RFPs come through, but they are not winning the business. Other comments as follows:
    - "Why put your systems in a 'nursing home' and get mediocre care for them? . . . Technology decisions are too important to hand over completely to an outside party . . . Outsourcing is more appropriate for 'pruning rather than growing companies.'"

Most vendors indicated cost/economic issues as supporting the trend towards outsourcing, including the growing role of users in systems decisions, and current economic pressures.

- Banks' outsourcing is primarily a balance sheet decision -- reduction in assets by selling data centers to outsourcing vendors improves the balance sheet. (Cap Gemini)

3b. Trends in systems development -- next 3-4 years

More growth is seen in packages, kernel, and CASE, with mixed views on custom. Responses are summarized in the following exhibit:

EXHIBIT B
TRENDS IN DEVELOPMENT APPROACHES - VENDORS

ITEM	Greater	Less	Same
Packages	5	1	0
Kernel/CASE	4	0	2
Custom Development	1	2	1

4a. Differences in trends by industry or country

A whole variety of comments, as noted below Comments are summarized by vendor.

- AGS: All industries interested in UNIX and open systems. Europe and U.S. have same level of interest in this area. Europe just being hit by recessionary pressures driving outsourcing that have affected U.S.

- AMS: Banks do more outsourcing. Architecture and open systems more important in Europe than U.S.

- CSC: Both U.S. and European-based companies take an increasingly global approach in systems planning. "Common systems," e.g. financials, often package-based. "Non-common systems" usually more strategic, custom-developed. Customer-oriented systems may be "non-common" but need a common look across geographic areas.

- Cap Gemini: Outsourcing decisions in banks a balance sheet decision (selling data center assets), whereas other industries such as manufacturing look at this as an opportunity to use resources better.

- EDS: Buy vs. make is company/personality driven. If the industry is willing to outsource in other areas, they will outsource information systems.

- Andersen: CASE is used heavily in utilities and financial services. Europe except for the UK is heavier on software and tools than the U.S. (work currently being sold in the UK is more heavily custom). Japan is still more heavily custom, and emphasis on custom development continues to be profitable there. Suggests that the shift towards packages and tools in Japan ("catching up") will be much faster than in Europe and the U.S.

4b. Difference in systems development for strategic functions, e.g. more custom development.

The overall consensus is that custom systems are more likely to be strategic or mission critical.

- Cap Gemini, CSC: Strategic systems tend to be custom.
- AMS: The real question is "What's the payoff? There must be a big return from the system to justify custom development.
- EDS: Projects that truly impact business processes generate a willingness to buy custom development services.
- Andersen: Strategic systems tend to be kernel or custom, to get a "unique spin" on the problem. Tactical systems will tend towards vanilla or partially assisted packages.
- AGS: Package-based business is doing relatively better than custom right now. Some custom may be delayed in this risk/cost conscious time.

4c. Are clients looking to more fundamentally re-engineer business functions?

Five of six vendors see re-engineering as a growing trend:

- EDS: 30-40% are doing it now, 60% are willing to consider it in the longer term.
- AMS: Image processing and expert systems are examples of new technologies that drive change. Benefits can these technologies can only be realized when workflows are changed.
- CSC: Re-engineering is very hot, especially in leading edge firms (Fortune top 100). Other more conservative companies will eventually follow. Consumer products companies are very competitive, and are leaders in this area. Telecommunications is an example of a conservative industry, not yet re-engineering.
- Andersen: Client server implementations require re-engineering. Consultants are pushing users towards re-engineering in some cases.

- Cap Gemini: Qualified yes to re-engineering. Can't re-engineer functions alone. IT and business have to change simultaneously. Systems are integral to business functions.

- AGS: No to the "re-engineering trend." Clients know what they want. AGS has established a benchmarking group that measures systems performance (network, operations center, software development). They see this as more important than business function re-design.

8. Differences in 3-4 years time

A variety of comments:

- EDS: Software more accessible to other software; more commoditized.

- Andersen: Growth of client/server and cooperative processing. Standards will reduce the cost and difficulty of integration, so more work will be in-house. More in-house development for non-mission critical systems - "glue." The services industry believes there will be more outsourcing, but success is not proven. Certain user industries may outsource to achieve standards. Past examples of this are the travel industry (SABRE), and credit card processing standards.

- AGS: Consolidation of business units, alliances in the IS industry. Providers need to be able to integrate different technologies and provide "total solution" via own staff or alliances to compete with the largest vendors.

- AMS: Less in-house development, but vendors doing more of it. Also, every new technology drives more custom work until it stabilizes and is "packaged," e.g. imaging, expert systems currently need a lot of custom work.

- CSC: More vendor-driven custom development. Too complex for users alone now without outside expertise. Outsourcing will grow faster than packaged software or professional services as a whole. Object-oriented will become a significant alternative. Less in-house development. More outsourcing.

2. Organization of the IS staff

A possible trend among users is to decentralize systems development. Four of seven users are decentralized - three by business unit and a fourth by region:

- Automotive: Currently organizes developers by function and project, but plans to decentralize into seven U.S. regional operations.
- Pharmaceuticals: Very decentralized. Each business unit has a director in charge of systems. Managers within each unit are responsible for functional areas such as marketing, research, finance, or manufacturing.
- Bank: Decentralized into business units; organized by function and project within units.
- Insurance: Each business unit has their own developers.

Two others have elements of both centralized and decentralized organization.

- Larger food company: Corporate systems are centralized, and are organized by function/project. Some divisions also have their own development staff.
- Chemicals: Has four "regions," each with their own systems group: Americas/corporate, Europe, Asia/pacific, and Research/Engineering.

Only one user company (smaller food co.) is completely centralized, and organized by project.

3a-3d. Development approaches, next 12-24 months.

The following exhibit summarizes users' development approaches. Detailed comments follow the exhibit.

EXHIBIT C
ESTIMATED PERCENTAGE OF PROJECTS - NEXT 1-2 YEARS
USERS

ITEM	"Vanilla" Package	Mix Package/ Custom	Kernel/ CASE	Pure Custom
Food Processing				
· Kraft General Foods	20% (a)	40% (a)	30% (b)	10%
· Quaker Oats	very little	25% (c)	50%	25%
Chemicals				
· Arco Chemical	very little	65%	none	35%
Pharmaceuticals				
· Syntex	decreasing	some	70%	light
Automobile				
· Nissan/USA	financials	none	none	heavy
Financial Services				
· Mellon Bank	financials	fin rptg (d)	app maint (e)	moderate
· Met. Life Insurance	very little	20%	20%	60%

(a) *Includes financial, human resources, and manufacturing applications: some customized, others not.*

(b) *100% of projects use CASE (Knowledgeware's IEW) in the design phase. 30% use APS for development/code generation.*

(c) *Includes significant customization of human resource/payroll software using vendor-provided development tools. Quaker also plans customization of manufacturing, materials management, and inventory packages.*

(d) *Currently customizing financial packages to add missing planning and reporting functions. Has also customized banking packages for their processing services business.*

(e) *Using CASE for re-engineering existing applications.*

Application packages with little customization:

The user group came out relatively low on "vanilla" package implementations, but possibly less so than the vendors.

- The most common packaged applications to be installed in this manner are financials and human resources.

Customized application packages:

Packaged systems are a major part of users' development plans for the next 12-to-24 months.

- Four of seven users estimated that package-based systems constitute at least 20% of systems planned. The two biggest package users said about 60-65% of new systems will use packages (see Exhibit C above).

A large amount of this work includes significant customization.

- Four of seven users are customize most packages (both food companies, chemicals, insurance).

- One installs certain financials vanilla, but adds custom modules for planning and reporting; also customizes some banking packages to support its processing services business (bank).

- One is avoiding customization of packages. All packages planned are for financials (automotive).

- One is avoiding packages; has decreased use of them in recent years due to problems with implementation and vendor support (pharmaceuticals).

The biggest package users interviewed are the larger food company, and the chemicals company. Both customize packages heavily. Their package-based activity is summarized below:

- The food company is close to the top of the group in IS budget ($100 million). 60% of new systems will be package-based - all financials and manufacturing. This is a major shift from development in past years, which was mostly custom.

- The chemicals company has the smallest IS budget of the group ($20 million). 65% of new systems are package-based - financials, manufacturing, plant maintenance, and stores inventory. Part of the decision to move towards packages came from deadline pressure - management decided to move all applications to AS/400s from an IBM mainframe.

The most common systems project planned involved human resource-related applications, all package-based.

- Five of seven users plan human resource and/or payroll systems in the next one-to-two years (both food companies, chemicals, automotive, bank).

Problems with packages noted by companies who use packages the least include:

- Lack of fit with business requirements requires major modifications (insurance company).
- Difficulty in implementation; lack of flexibility compared to CASE or custom as business requirements change over time; problems when vendors stop supporting packages (chemicals).

Kernel/CASE-based solutions

The user companies as a group have taken significant steps towards implementing CASE technologies. Five of seven users use CASE tools for a significant amount of development and/or maintenance projects, although the remaining two companies do not use kernel or CASE at all.

- Three of five companies using CASE (food companies, pharmaceuticals) indicated that CASE is the preferred development approach for strategic, mission critical, or high priority systems.

CASE users use the tools as follows:

- Pharmaceuticals company: Heavy use of CASE (70% of projects). Using Texas Instruments' IEF for several projects; Oracle CASE being used for nine research systems - "the largest project in the history of the company." One CASE system is in production; two are about to go live.

- Larger food company: 30% of projects use APS for code generation. Current projects using APS are order management applications. 100% of projects use Knowledgeware's IEW for design.
- Smaller food company: 50% of projects use CASE. Andersen's Install/1 is being used for a sales and promotions management system.
- Insurance company: "a little" CASE development; approximately 20%
- Bank: Using CASE tools to re-engineer existing applications.

Two user companies indicated no kernel/CASE development, and no plans to move in this direction (automotive, chemicals). The chemical company is considering EIS development tools, but is not convinced of the cost/benefit.

Custom systems development

Custom development still comprises a significant amount of work among the user group

- Two user companies (automotive, insurance) indicated that custom work is "heavy" or over 50% of development.
- The remaining five companies described custom projects as light to moderate, or in the range of 10-35% of development.

Comments on custom development are as follows:

- Insurance: The largest portion (60%) of development. Expected to remain strong for the foreseeable future.
- Bank: Doing less than in the past, but certain of their products are unique and no packages exist. Examples are "the bad loan business", and real estate repossession.
- Automotive: Global order entry, global warrant system in development. Notes that custom development is typical for the auto industry.

- Pharmaceuticals: Considers "custom" to equate to CASE. 70% of projects are CASE-based. Go with traditional custom where CASE won't work. Feels CASE is appropriate for very large, enterprise-wide systems. Using custom for some systems which are smaller in scope, but notes that many smaller "custom" systems can now be done PC-based software such as Windows and Lotus.

- Larger food company: Custom work planned is only about 10% - a big reduction from the past. Custom development is appropriate for certain utility functions, e.g. special subroutines where code generation won't work.

- Smaller food company: Custom work is primarily for maintenance of existing custom systems.

- Chemicals: Planned custom where packages did not support needs. Applications include order processing, sales, marketing, logistics (rail card tracking only), labor and project accounting, product profitability performance.

3e. Difference in systems development for strategic functions, e.g. more custom development.

Strategic systems are more likely to be custom or CASE. Various comments indicate the need for more flexibility in these systems. Company comments follow:

- Larger food company: Views systems as being in one of two classes "Strategic" systems can be in either group, but tend to use different kernel or CASE approaches.
  - Business operational systems, e.g. financials, human resources, order entry. Some of these, such as order entry, are mission critical and high priority, and use a code generation development approach.
  - Data driven systems. e.g. marketing and marketing analysis; considered strategic. These tend to use data bases of internal and external information, and retrieval tools. They may also use DIS systems and common in-house-developed "capsules."

- Smaller food company: Does not think strategic systems have to be custom or CASE necessarily. They can use packages if there's an appropriate product available. CASE is being used for their sales and promotions system, which is considered strategic.

- Pharmaceuticals: Uses CASE, not custom, for strategic systems.

- Chemicals: IS is more open to requests for changes and enhancements for strategic systems.
- Automotive: Non-strategic/production systems are done on PCs.
- Insurance: Packages are used more for standard back/office functions such as financials.
- Bank: Systems which are market differentiators tend to be heavily custom, e.g. cash management, where this bank is a leader.

3f. Are you looking to more fundamentally re-engineer business functions?

The consensus is towards some degree of re-engineering. Six of seven users are using this approach in new systems. The seventh said they did not have the time (all systems had to be converted quickly due to a hardware change).

Companies doing re-engineering cite changes in business (mergers, acquisitions, decentralizing, competitive pressures, and systems downsizing) as driving forces behind this activity:

- Automotive: Decentralizing to 7 regions.
- Bank: Heavy acquisitions in the retail banking business drove the need to re-structure systems, e.g. loan approvals were centralized and applications were decentralized.
- Larger food company: Merger is necessitating re-engineering.
- Smaller food company: Just beginning re-engineering for customer service and trade marketing.
- Pharmaceuticals: Re-engineering was undertaken in research systems area in effort to reduce product development time. Seen as very important; expecting "dramatic" change.
- Insurance: Not a lot of re-engineering, but systems downsizing requires some of this.

4. High priority systems

Highest priority systems mentioned by users include the following. Applications mentioned the most frequently are listed first.

- Food, Pharmaceuticals, and Automotive: Marketing and sales; laptop systems
- Food, Chemicals, and Automotive: Order management/order processing
- Automotive: Customer service/warranty system
- Food: Logistics, warehousing, materials management
- Chemicals: Plant maintenance and safety-related systems
- Pharmaceuticals: Research/product development
- Banking: Wire transfer, trust processing, direct customer systems, and bulk data transfer

Human resource systems were the most commonly mentioned projects among users, but none were considered "high priority:" Several users mentioned that human resources was last on the priority list.

- Two of the five indicated low-to-no customization is planned.

5. Plan to use outside resources?

Unanimous yes, but some users mentioned plans to decrease use of outsiders.

- Smaller food company: Technology transfer process is ending; will decrease use of outsiders.
- Insurance: Plans very little increase. Trying to ultimately reduce use of services for cost reasons.

10. Trends in systems development -- next 3-4 years

The most growth is seen in CASE. Users expect package and custom is expected to decrease or stay flat overall. Responses are summarized in the following exhibit:

EXHIBIT D
TRENDS IN DEVELOPMENT APPROACHES - USERS

ITEM	Greater	Less	Same
Packages	2	0	3
Kernel/CASE	4	0	1
Custom Development	2	1	2

10. Possible outsourcing of a business function

Four companies (automotive, chemicals, both food companies) might consider outsourcing at some point, but none have definite plans to go this way.

- Automotive: Possibility of outsourcing applications maintenance.
- Chemicals: Doing the cost analysis now; don't expect it will happen.
- Larger food company: Might be a possibility "where it makes sense." Need to establish proper guidelines.
- Smaller food company: It is a possibility, although no plans to outsource. Need to periodically look at outsourcing as an option.

One company (bank) does outsourcing for other banks as part of its business; would not consider outsourcing its own systems.

JOAN FRAME

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U.S. Interviews -- Company Names Legend
(for reference only)

Following are cross-references between the vendor references and industries mentioned in the client report, and actual company names.

VENDORS

- Vendor 1: Computer Sciences Corp.- commercial systems group
- Vendor 2: American Management Systems
- Vendor 3: Nynex/AGS Computer Services
- Vendor 4: Cap Gemini America
- Vendor 5: Andersen Consulting
- Vendor 6: Electronic Data Systems

BACKUP, "Sanitized"

USERS

- Food and Beverage:
  1.) Kraft Foods - "larger food co."
  2.) Quaker Oats - "smaller food co."
- Chemicals: Arco Chemical Co.
- Pharmaceuticals: Syntex Corp.
- Automotive: Nissan/USA
- Insurance: Metropolitan Life
- Banking: Mellon Bank

Coopers and Lybrand
Custom Project
Summary of U.S. Interviews -- 11/1/91

(FINAL)

Introduction

This summary is based on interviews of six major information services vendors and seven user companies. Vendor names and user industries are listed below.

Vendors:
- American Management Systems
- Andersen Consulting
- Cap Gemini America
- Computer Sciences Corp.- commercial systems group
- Electronic Data Systems
- Nynex/AGS Computer Services

User Industries:
- Food and Beverage (2 companies)
- Chemicals
- Pharmaceuticals
- Automotive
- Insurance
- Banking

Contents of this report are as follows:

- **Overall Conclusions:** This section lists highlights of the findings, from both vendor and user interviews.
- **Analysis by Question - Vendors:** Detailed findings, following the order of the vendor interviews, and referenced by vendor question numbers (open-ended or qualitative questions only). Responses to key questions on development approaches are summarized in tables.
- **Analysis by Question - Users:** Detailed findings, following the order of the user interviews, and referenced by user question numbers (open-ended or qualitative questions only). Responses to key questions on development approaches are summarized in tables.

Overall Conclusions

Overall trends noted are as follows:

Application Packages:

Software packages are widely used, but primarily for financial, human resources, and some manufacturing applications.

References to industry-specific software were less focused, but came up in various contexts:

- Four out of six vendors stated that they work with manufacturing application packages.
- Three of six vendors derive significant percentages of revenue from proprietary industry-specific software, including products for the manufacturing, distribution, banking, government, and telecommunications sectors.
- Vendors also mentioned use of third party software for health care, insurance, and logistics applications.
- Users mentioned package-based systems for manufacturing applications, materials management, and inventory (food, chemicals); plant maintenance (chemicals); and banking systems (for bank processing services).

Vendors reported a low level of "vanilla" installs. Users appear to do some amount of these, but on their own.

- One vendor confirmed that even in sales of its proprietary software, it is rarely-to-never contracted for implementation services unless significant customization is required.
- Note that package customization may include actual code modification, as well as significant tailoring using vendor-provided tools.

Kernel/CASE Development:

Use of a kernel/CASE approach varies from none to very heavy, with certain user companies the most heavily invested in this approach.

- Four of seven user companies interviewed use CASE tools for 20% or more of their development projects; a fifth uses CASE re-engineering facilities for most of its applications maintenance.
    - Three companies using CASE (food companies, pharmaceuticals) see this as the preferred approach for developing strategic, high priority, or mission critical systems.
    - The pharmaceutical company has made CASE development the corporate standard, with 70% of development projects using CASE tools.
- Only two of six vendors claim to employ a kernel/CASE approach in a significant percentage of projects.
    - One of these favors proprietary and third party CASE tools for the most part; the other focuses on pre-coded applications (not developed to the point where they are considered a "package.")

Custom Systems Development:

The degree of custom development among large vendors and large user companies appears to have declined overall.

- Some vendors commented that the increasing complexity of these systems supports a trend for more custom work to be contracted out to services firms.

Custom applications are typically more strategic, mission critical, and customer-oriented. They must justify their high cost and risk with significant returns.

Future Development Trends:

Views on development trends 3-4 years in the future are generally as follows:

- Greater use of packages, primarily in financial/back office systems, and manufacturing-related applications
- Greater use of kernel/CASE approaches
- Custom development decreasing or staying the same

Vendors' Industry Specialization:

Vendors' industry specializations vary by company, but common verticals are manufacturing, financial services, and government.

High Demand Applications:

Application areas mentioned by vendors as being in particularly high demand are:

- Any systems considered strategic or mission critical. Specific applications vary by industry.
- Customer-oriented systems: sales and marketing, customer service, order processing. User comments on their highest priority systems supported vendors' comments here.
- Factory shop floor systems

Highest priority systems mentioned by users include the following. Applications mentioned most frequently are listed first.

- Food, Pharmaceuticals, and Automotive: Marketing and sales; laptop systems
- Food, Chemicals, and Automotive: Order management/order processing
- Automotive: Customer service/warranty system
- Food: Logistics, warehousing, materials management

- Chemicals: Plant maintenance and safety-related systems
- Pharmaceuticals: Research/product development
- Banking: Wire transfer, trust processing, direct customer systems, and bulk data transfer

Human resource systems were the most commonly mentioned projects among users, but none were considered "high priority:"

- Five of seven companies have human resource and/or payroll systems projects under way. All are package-based.

Outsourcing:

Outsourcing is seen by a trend more emphatically by vendors than users.

- All but one vendor sees this as an important trend; one of these has traditionally focused on outsourcing.
- Four users see outsourcing as an option that must be evaluated, or that they might consider at some time in the future. None indicated specific plans to outsource.

Business Function Re-engineering:

Interest in re-engineering business functions is high among both vendors and users.

- Six of seven users said business re-engineering was ongoing to some degree; four have made significant investments in this area.
- Five of six vendors see re-engineering growing.

IS Organization:

A possible trend among users is to decentralize systems development.

- Four of seven users are decentralized - three by business unit and a fourth (automotive) by region.
- Two others have elements of both centralized and decentralized organization.
- Only one user company (smaller food co.) is completely centralized.

Analysis by Question - Vendors

1. Development approaches, next 12-24 months.

The following exhibit summarizes vendors' development approaches. Detailed comments follow the exhibit.

EXHIBIT A
ESTIMATED PERCENTAGE OF PROJECTS - NEXT 1-2 YEARS
VENDORS

ITEM	"Vanilla" Package	Mix Package/ Custom	Kernel/ CASE	Pure Custom
Vendor 1	very little	some (a)	interest (b)	heavy (a)
Vendor 2	5-10%	50%	25% (c)	25%
Vendor 3	<5% (d)	aim here	very little (e)	moderate
Vendor 4	very little	20%	none (f)	70-80%
Vendor 5	5%	60%	30% (g)	5%
Vendor 6	very little	20%	some (h)	80% (h)

(a) Vendor 1's "typical" integration deal is 10-15% software license fees; 45% custom and services; 40% hardware.

(b) Interest among clients, but no widespread success stories.

(c) Vendor 2 uses primarily "core foundation software." The term refers to pre-coded applications not to the level of a package.

(d) . . . for cost, time savings

(e) Vendor 3 uses the term "platform" to refer to productivity gains from industry expertise and design skills; does not equate this to kernel.

(f) Vendor 4 sometimes offers previously-used designs; rarely previously-used code. Does not see kernel as a viable option until object-oriented technology matures.

(g) Primarily use of proprietary CASE tools, sometime in conjunction with "designware" Also includes some work using third party CASE tools, productivity aids, and EIS products.

(h) Vendor 6 estimated that 80% of work falls in the area of custom and kernel, but that most is custom. Feels kernel has no real value in their customers' eyes.

Application packages with little customization:

All vendors stated that "vanilla" package implementations with little-to-no customization are extremely rare.

- Vendor 5 noted that even in sales of its own products, they are rarely contracted for services when significant customization is not required. Usually these cases involve AS/400-based financial modules, sold through a re-seller.

Customized application packages:

Projects involving a mix of package and custom development are quite common - up to 50-60% of business for the leaders in this area.

Vendor 1 noted that most major integration deals involve a mix of package and custom work, with the typical fee breakdown as follows: 40% hardware, 10-15% package software licenses, and 45% customization and custom development.

Two vendors (vendors 1 and 5) noted a concern that third party software providers have not kept up with users' expressed needs for client/server-based systems. One suggested that this might slow down sales of financial software products.

Vendors 2 and 5 have the most package-intensive businesses of vendors interviewed; both also have their own industry-specific software products.

- Both vendors indicated that their software development either takes place in conjunction with client projects, or is driven by clients' needs.
    - Examples of recent "products" developed by Andersen include two designware packages: one for the utility industry, and another for financial services firms; and a set of process manufacturing applications.
- Vendor 2's package-based business can be summarized as follows:
    - Comprises approximately 50% of revenues
    - Over 15% of revenues are from license fees for government, banking, and telecommunications software products.
    - Uses proprietary applications almost exclusively.

- Vendor 5's package-based business can be summarized as follows:
  - Comprises approximately 60% of revenues
  - About 10% of revenues are from license fees, primarily for manufacturing and distribution software products.
  - Uses both proprietary applications and third party products.

Reasons given for customizing packages include:

- Too many client-specific issues
- Need for custom interfaces
- Complexity of clients' businesses, and the large size of most clients.

Applications mentioned frequently as typical for packages were financial, back/office, and some manufacturing functions. Other applications mentioned are listed below:

- Banking applications (Vendors 2 and 3 - proprietary software)
- Manufacturing, MRPII (Vendors 1 and 6 - third party software; Andersen proprietary software)
- Logistics and distribution (Vendor 6 - third party software; Vendor 5 - proprietary software)
- Health care applications (Vendor 1 - third party software)
- Insurance (Vendor 6 - third party software)
- Customer systems for the telecommunications industry; financial and administrative systems for state and local governments (Vendor 2 - proprietary software)

Vendor 1 noted the manufacturing and health care industries are more package-oriented than most.

Kernel/CASE-based solutions:

There was far less agreement among vendors on this issue than on packages, and less CASE activity among vendors than users.

There was general agreement that kernel or CASE development has future potential, but only two vendors (Vendors 2 and 5) have significant business in this area - 25% and 30%, respectively.

Vendors also differ widely in approach to the problem of increasing productivity in development of "custom" or "non-packaged" systems, as the following examples illustrate.

- Vendor 1: Notes high interest in tools to develop and support applications, but no consistently big success stories.
- Vendor 2: Offers "core foundation software" used as a starting point for development; not a full blown package. Some clients find this preferable / more flexible than a fully coded package for applications where business requirements differ among companies, e.g. distribution applications.
- Vendor 3: Feels that Industry-specific design expertise (not coded kernels or components) that a vendor brings to a client are more effective in speeding up expedite development.
- Vendor 4: Kernel approach is not a part of their current business. Expect this to change as object oriented technology matures, but not in the near future. Offers clients previously used functional designs. Feel this is more usable than previously written code. This approach often wins in competition with software packages.
- Vendor 5: Has their own CASE product, estimates work with proprietary and third party tools including EIS is 30% of business.

- Vendor 6: Notes a number of problems with kernel/CASE:
  - Not a large part of current business because customers do not perceive value in this approach; tools only assist the vendor in doing the project faster.
  - CASE tools are not powerful or flexible enough - they are only useful when they cover the whole scheme of design-development-maintenance and allow a high degree of customization.
  - Kernels also require a high degree of customization. Beginning to consider use of kernels in downsizing existing applications.

Custom systems development

This remains the majority of business for three of the six vendors (Vendors 1, 4, and 6).

Comments offered by vendors are as follows:

- Vendor 1: Custom work is very prevalent, especially for strategic/mission critical applications, e.g. customer, sales, order processing systems.
- Vendor 2: The technical environment may sometimes dictate custom development because available packages do not operate on the client's platform.
- Vendor 3: Existing platforms can reduce time and cost, but lots of custom work still happens; not expected to decrease.
- Vendor 4: 70-80% of work is still custom, because packages are not available for unique or mission critical business functions, and sometimes as a matter of clients' philosophy (to make their own rather than buy outside-developed systems).
- Vendor 5: Although only 5% of business is estimated to be purely custom (and decreasing), possibly 50% of "function points" produced for clients are custom, indicating a high degree of mixed development.

2. Types of systems being developed for clients:

Responses vary widely by company. Each has specialization in different vertical markets.

- Vendor 1: Hot areas are customer sales, marketing, customer service, order processing, and materials management
- Vendor 2: Government (all levels), banking, telecommunications
- Vendor 3: Financial and insurance industry (mostly packages in banks, custom for insurance and brokerage); discrete manufacturing; state and local government; network-oriented systems
- Vendor 4: Manufacturing, all levels: shop floor to MRP
- Vendor 5: Roughly follows the SIC code mix, i.e. manufacturing the largest group, but business in government sectors is proportionately lower.
    - Mostly mission critical systems, planning and implementation.
    - Oil and gas is particularly quiet, but with an upswing in order processing and distribution systems. Less in industry-specific financials (joint interest billing, etc.)
    - Doing more with hardware/device-specific interfaces; "workplace floor," e.g. health care, factory floor.
    - Customer service and client/server systems appear to be "hot."
- Vendor 6: Transportation, energy, manufacturing, health care (new systems); finance and insurance (mostly consolidation)

3a. Trends in systems development -- outsourcing

All vendors but one felt that outsourcing is definitely a growing trend.

- Vendor 1: is building its outsourcing business; recently closed a very large defense industry contract. Recommends outsourcing of commodity systems as a way to focus internal resources on value-added systems. Sees outsourcing growing faster than packages or custom development.

- Vendor 2: expects this market will increase as users' influence in systems decisions grows (users are more cost conscious).
- Vendor 3: sees outsourcing as growing, but not a cascade or waterfall
- Vendor 4: sees outsourcing growing in all industries, especially high volume users; primarily mainframe systems.
- Vendor 5: (alone) is not convinced that outsourcing is here to stay. Suggests this is more of a trend in the non-Fortune 100 arena, e.g. small government organizations, regional cooperative power companies, regional hospitals. Notes that a few RFPs come through, but they are not winning the business. Other comments as follows:
  - "Why put your systems in a 'nursing home' and get mediocre care for them? . . . Technology decisions are too important to hand over completely to an outside party . . . Outsourcing is more appropriate for 'pruning rather than growing companies.'"
- Vendor 6: has traditionally focused its business in this area.

Most vendors indicated cost/economic issues as supporting the trend towards outsourcing, including the growing role of users in systems decisions, and current economic pressures.

- Banks' outsourcing is primarily a balance sheet decision -- reduction in assets by selling data centers to outsourcing vendors improves the balance sheet. (Vemdor 4)

3b. Trends in systems development -- next 3-4 years

More growth is seen in packages, kernel, and CASE, with mixed views on custom. Responses are summarized in the following exhibit:

EXHIBIT B
TRENDS IN DEVELOPMENT APPROACHES - VENDORS

ITEM	Greater	Less	Same
Packages	5	1	0
Kernel/CASE	4	0	2
Custom Development	1	2	1

4a. Differences in trends by industry or country

A whole variety of comments, as noted below Comments are summarized by vendor.

- Vendor 1: Both U.S. and European-based companies take an increasingly global approach in systems planning. "Common systems," e.g. financials, often package-based. "Non-common systems" usually more strategic, custom-developed. Customer-oriented systems may be "non-common" but need a common look across geographic areas.
- Vendor 2: Banks do more outsourcing. Architecture and open systems more important in Europe than U.S.
- Vendor 3: All industries interested in UNIX and open systems. Europe and U.S. have same level of interest in this area. Europe just being hit by recessionary pressures driving outsourcing that have affected U.S.
- Vendor 4: Outsourcing decisions in banks a balance sheet decision (selling data center assets), whereas other industries such as manufacturing look at this as an opportunity to use resources better.
- Vendor 5: CASE is used heavily in utilities and financial services. Europe except for the UK is heavier on software and tools than the U.S. (work currently being sold in the UK is more heavily custom). Japan is still more heavily custom, and emphasis on custom development continues to be profitable there. Suggests that the shift towards packages and tools in Japan ("catching up") will be much faster than in Europe and the U.S.
- Vendor 6: Buy vs. make is company/personality driven. If the industry is willing to outsource in other areas, they will outsource information systems.

4b. Difference in systems development for strategic functions, e.g. more custom development.

The overall consensus is that custom systems are more likely to be strategic or mission critical.

- Vendors 1, 4: Strategic systems tend to be custom.
- Vendor 2: The real question is "What's the payoff? There must be a big return from the system to justify custom development.
- Vendor 3: Package-based business is doing relatively better than custom right now. Some custom may be delayed in this risk/cost conscious time.
- Vendor 5: Strategic systems tend to be kernel or custom, to get a "unique spin" on the problem. Tactical systems will tend towards vanilla or partially assisted packages.
- Vendor 6: Projects that truly impact business processes generate a willingness to buy custom development services.

4c. Are clients looking to more fundamentally re-engineer business functions?

Five of six vendors see re-engineering as a growing trend:

- Vendor 1: Re-engineering is very hot, especially in leading edge firms (Fortune top 100). Other more conservative companies will eventually follow. Consumer products companies are very competitive, and are leaders in this area. Telecommunications is an example of a conservative industry, not yet re-engineering.
- Vendor 2: Image processing and expert systems are examples of new technologies that drive change. Benefits can these technologies can only be realized when workflows are changed.
- Vendor 3: No to the "re-engineering trend." Clients know what they want. Has established a benchmarking group that measures systems performance (network, operations center, software development). They see this as more important than business function re-design.
- Vendor 5: Client server implementations require re-engineering. Consultants are pushing users towards re-engineering in some cases.

- Vendor 4: Qualified yes to re-engineering. Can't re-engineer functions alone. IT and business have to change simultaneously. Systems are integral to business functions.

- Vendor 6: 30-40% are doing it now, 60% are willing to consider it in the longer term.

8. Differences in 3-4 years time

A variety of comments:

- Vendor 1: More vendor-driven custom development. Too complex for users alone now without outside expertise. Outsourcing will grow faster than packaged software or professional services as a whole. Object-oriented will become a significant alternative. Less in-house development. More outsourcing.

- Vendor 2: Less in-house development, but vendors doing more of it. Also, every new technology drives more custom work until it stabilizes and is "packaged," e.g. imaging, expert systems currently need a lot of custom work.

- Vendor 3: Consolidation of business units, alliances in the IS industry. Providers need to be able to integrate different technologies and provide "total solution" via own staff or alliances to compete with the largest vendors.

- Vendor 5: Growth of client/server and cooperative processing. Standards will reduce the cost and difficulty of integration, so more work will be in-house. More in-house development for non-mission critical systems - "glue." The services industry believes there will be more outsourcing, but success is not proven. Certain user industries may outsource to achieve standards. Past examples of this are the travel industry (SABRE), and credit card processing standards.

- Vendor 6: Software more accessible to other software; more commoditized.

2. Organization of the IS staff

A possible trend among users is to decentralize systems development. Four of seven users are decentralized - three by business unit and a fourth by region:

- Automotive: Currently organizes developers by function and project, but plans to decentralize into seven U.S. regional operations.
- Pharmaceuticals: Very decentralized. Each business unit has a director in charge of systems. Managers within each unit are responsible for functional areas such as marketing, research, finance, or manufacturing.
- Bank: Decentralized into business units; organized by function and project within units.
- Insurance: Each business unit has their own developers.

Two others have elements of both centralized and decentralized organization.

- Larger food company: Corporate systems are centralized, and are organized by function/project. Some divisions also have their own development staff.
- Chemicals: Has four "regions," each with their own systems group: Americas/corporate, Europe, Asia/pacific, and Research/Engineering.

Only one user company (smaller food co.) is completely centralized, and organized by project.

3a-3d. Development approaches, next 12-24 months.

The following exhibit summarizes users' development approaches. Detailed comments follow the exhibit.

EXHIBIT C
ESTIMATED PERCENTAGE OF PROJECTS - NEXT 1-2 YEARS
USERS

ITEM	"Vanilla" Package	Mix Package/ Custom	Kernel/ CASE	Pure Custom
Food (larger co.)	20% (a)	40% (a)	30% (b)	10%
Food (smaller co.)	very little	25% (c)	50%	25%
Chemicals	very little	65%	none	35%
Pharmaceuticals	decreasing	some	70%	light
Automobile	financials	none	none	heavy
Bank	financials	fin rptg (d)	app maint (e)	moderate
Insurance	very little	20%	20%	60%

(a) *Includes financial, human resources, and manufacturing applications: some customized, others not.*

(b) *100% of projects use CASE (Knowledgeware's IEW) in the design phase. 30% use APS for development/code generation.*

(c) *Includes significant customization of human resource/payroll software using vendor-provided development tools. Quaker also plans customization of manufacturing, materials management, and inventory packages.*

(d) *Currently customizing financial packages to add missing planning and reporting functions. Has also customized banking packages for their processing services business.*

(e) *Using CASE for re-engineering existing applications.*

Application packages with little customization:

The user group came out relatively low on "vanilla" package implementations, but possibly less so than the vendors.

- The most common packaged applications to be installed in this manner are financials and human resources.

Customized application packages:

Packaged systems are a major part of users' development plans for the next 12-to-24 months.

- Four of seven users estimated that package-based systems constitute at least 20% of systems planned. The two biggest package users said about 60-65% of new systems will use packages (see Exhibit C above).

A large amount of this work includes significant customization.

- Four of seven users are customize most packages (both food companies, chemicals, insurance).
- One installs certain financials vanilla, but adds custom modules for planning and reporting; also customizes some banking packages to support its processing services business (bank).
- One is avoiding customization of packages. All packages planned are for financials (automotive).
- One is avoiding packages; has decreased use of them in recent years due to problems with implementation and vendor support (pharmaceuticals).

The biggest package users interviewed are the larger food company, and the chemicals company. Both customize packages heavily. Their package-based activity is summarized below:

- The food company is close to the top of the group in IS budget ($100 million). 60% of new systems will be package-based - all financials and manufacturing. This is a major shift from development in past years, which was mostly custom.

- The chemicals company has the smallest IS budget of the group ($20 million). 65% of new systems are package-based - financials, manufacturing, plant maintenance, and stores inventory. Part of the decision to move towards packages came from deadline pressure - management decided to move all applications to AS/400s from an IBM mainframe.

The most common systems project planned involved human resource-related applications, all package-based.

- Five of seven users plan human resource and/or payroll systems in the next one-to-two years (both food companies, chemicals, automotive, bank).

Problems with packages noted by companies who use packages the least include:

- Lack of fit with business requirements requires major modifications (insurance company).
- Difficulty in implementation; lack of flexibility compared to CASE or custom as business requirements change over time; problems when vendors stop supporting packages (chemicals).

Kernel/CASE-based solutions

The user companies as a group have taken significant steps towards implementing CASE technologies. Five of seven users use CASE tools for a significant amount of development and/or maintenance projects, although the remaining two companies do not use kernel or CASE at all.

- Three of five companies using CASE (food companies, pharmaceuticals) indicated that CASE is the preferred development approach for strategic, mission critical, or high priority systems.

CASE users use the tools as follows:

- Pharmaceuticals company: Heavy use of CASE (70% of projects). Using Texas Instruments' IEF for several projects; Oracle CASE being used for nine research systems - "the largest project in the history of the company." One CASE system is in production; two are about to go live.

- Larger food company: 30% of projects use APS for code generation. Current projects using APS are order management applications. 100% of projects use Knowledgeware's IEW for design.

- Smaller food company: 50% of projects use CASE. Andersen's Install/1 is being used for a sales and promotions management system.

- Insurance company: "a little" CASE development; approximately 20%

- Bank: Using CASE tools to re-engineer existing applications.

Two user companies indicated no kernel/CASE development, and no plans to move in this direction (automotive, chemicals). The chemical company is considering EIS development tools, but is not convinced of the cost/benefit.

Custom systems development

Custom development still comprises a significant amount of work among the user group

- Two user companies (automotive, insurance) indicated that custom work is "heavy" or over 50% of development.

- The remaining five companies described custom projects as light to moderate, or in the range of 10-35% of development.

Comments on custom development are as follows:

- Insurance: The largest portion (60%) of development. Expected to remain strong for the foreseeable future.

- Bank: Doing less than in the past, but certain of their products are unique and no packages exist. Examples are "the bad loan business", and real estate repossession.

- Automotive: Global order entry, global warrant system in development. Notes that custom development is typical for the auto industry.

- Pharmaceuticals: Considers "custom" to equate to CASE. 70% of projects are CASE-based. Go with traditional custom where CASE won't work. Feels CASE is appropriate for very large, enterprise-wide systems. Using custom for some systems which are smaller in scope, but notes that many smaller "custom" systems can now be done PC-based software such as Windows and Lotus.

- Larger food company: Custom work planned is only about 10% - a big reduction from the past. Custom development is appropriate for certain utility functions, e.g. special subroutines where code generation won't work.

- Smaller food company: Custom work is primarily for maintenance of existing custom systems.

- Chemicals: Planned custom where packages did not support needs. Applications include order processing, sales, marketing, logistics (rail card tracking only), labor and project accounting, product profitability performance.

3e. Difference in systems development for strategic functions, e.g. more custom development.

Strategic systems are more likely to be custom or CASE. Various comments indicate the need for more flexibility in these systems. Company comments follow:

- Larger food company: Views systems as being in one of two classes "Strategic" systems can be in either group, but tend to use different kernel or CASE approaches.
  - Business operational systems, e.g. financials, human resources, order entry. Some of these, such as order entry, are mission critical and high priority, and use a code generation development approach.
  - Data driven systems. e.g. marketing and marketing analysis; considered strategic. These tend to use data bases of internal and external information, and retrieval tools. They may also use DIS systems and common in-house-developed "capsules."

- Smaller food company: Does not think strategic systems have to be custom or CASE necessarily. They can use packages if there's an appropriate product available. CASE is being used for their sales and promotions system, which is considered strategic.

- Pharmaceuticals: Uses CASE, not custom, for strategic systems.

- Chemicals: IS is more open to requests for changes and enhancements for strategic systems.
- Automotive: Non-strategic/production systems are done on PCs.
- Insurance: Packages are used more for standard back/office functions such as financials.
- Bank: Systems which are market differentiators tend to be heavily custom, e.g. cash management, where this bank is a leader.

3f. Are you looking to more fundamentally re-engineer business functions?

The consensus is towards some degree of re-engineering. Six of seven users are using this approach in new systems. The seventh said they did not have the time (all systems had to be converted quickly due to a hardware change).

Companies doing re-engineering cite changes in business (mergers, acquisitions, decentralizing, competitive pressures, and systems downsizing) as driving forces behind this activity:

- Automotive: Decentralizing to 7 regions.
- Bank: Heavy acquisitions in the retail banking business drove the need to re-structure systems, e.g. loan approvals were centralized and applications were decentralized.
- Larger food company: Merger is necessitating re-engineering.
- Smaller food company: Just beginning re-engineering for customer service and trade marketing.
- Pharmaceuticals: Re-engineering was undertaken in research systems area in effort to reduce product development time. Seen as very important; expecting "dramatic" change.
- Insurance: Not a lot of re-engineering, but systems downsizing requires some of this.

4. High priority systems

Highest priority systems mentioned by users include the following. Applications mentioned the most frequently are listed first.

- Food, Pharmaceuticals, and Automotive: Marketing and sales; laptop systems
- Food, Chemicals, and Automotive: Order management/order processing
- Automotive: Customer service/warranty system
- Food: Logistics, warehousing, materials management
- Chemicals: Plant maintenance and safety-related systems
- Pharmaceuticals: Research/product development
- Banking: Wire transfer, trust processing, direct customer systems, and bulk data transfer

Human resource systems were the most commonly mentioned projects among users, but none were considered "high priority:" Several users mentioned that human resources was last on the priority list.

- Two of the five indicated low-to-no customization is planned.

5. Plan to use outside resources?

Unanimous yes, but some users mentioned plans to decrease use of outsiders.

- Smaller food company: Technology transfer process is ending; will decrease use of outsiders.
- Insurance: Plans very little increase. Trying to ultimately reduce use of services for cost reasons.

10. Trends in systems development -- next 3-4 years

The most growth is seen in CASE. Users expect package and custom is expected to decrease or stay flat overall. Responses are summarized in the following exhibit:

EXHIBIT D
TRENDS IN DEVELOPMENT APPROACHES - USERS

ITEM	Greater	Less	Same
Packages	2	0	3
Kernel/CASE	4	0	1
Custom Development	2	1	2

10. Possible outsourcing of a business function

Four companies (automotive, chemicals, both food companies) might consider outsourcing at some point, but none have definite plans to go this way.

- Automotive: Possibility of outsourcing applications maintenance.
- Chemicals: Doing the cost analysis now; don't expect it will happen.
- Larger food company: Might be a possibility "where it makes sense." Need to establish proper guidelines.
- Smaller food company: It is a possibility, although no plans to outsource. Need to periodically look at outsourcing as an option.

One company (bank) does outsourcing for other banks as part of its business; would not consider outsourcing its own systems.